

**CHARLES RIVER STUDY**

*Summary of the Ninth Meeting of the  
Coordinating Committee  
for the  
Charles River Study  
at  
Waltham, Mass.*

*8 April 1971*

**Prepared by**

**Department of the Army**

**New England Division, Corps of Engineers**

**424 Trapelo Road, Waltham, Mass.**

SUMMARY OF THE NINTH MEETING OF THE  
COORDINATING COMMITTEE

CHARLES RIVER STUDY

8 APRIL 1971

1. The ninth meeting of the Coordinating Committee was held in the Reservoir Control Center, New England Division, Corps of Engineers Waltham, Massachusetts. Attached as Appendix A is a copy of the agenda. The following members and guests attended this meeting:

2. COORDINATING COMMITTEE MEMBERS OR ALTERNATES

a. Federal Agencies

U.S. Army, Corps of Engineers  
Frank P. Bane, Colonel, Committee Chairman

U.S. Department of Agriculture  
Mr. C.E. Mills, Soil Conservation Service

U.S. Department of Health, Education & Welfare  
Mr. Floyd B. Taylor, Public Health Service

b. State Agencies

Massachusetts Department of Natural Resources  
Mr. Clinton E. Watson, Resources Planner

Metropolitan District Commission  
Mr. Martin Cosgrove, Deputy Chief Engineer,  
Construction Division

Metropolitan Area Planning Council  
Mr. David Gardner, Principal Planner

3. GUESTS

Citizen Advisory Committee

Mrs. H. Shippen Goodhue  
Mrs. Talbot Baker  
Mr. William H. Claflin  
Mr. Henry J. Colombo  
Mr. Michael M. Ferris

### 3. GUESTS (cont'd)

#### Citizen Advisory Committee

Mrs. F. Murray Forbes  
Mr. John J. Gill  
Mr. Alan R. Minoff  
Hon. Leverett Saltonstall  
Mr. Robert T. Symonds  
Mr. Kenneth H. Wood

#### U.S. Department of Agriculture

Stephen G. Claughton

#### Environmental Protection Agency

William Butler, Water Quality Office  
James W. Lambie, Water Quality Office

#### U. S. Department of the Interior

Norrel Wallace, Fish & Wildlife Service  
Edwin H. Robinson, Fish & Wildlife Service  
Eugene H. Walker, U.S. Geological Survey  
Noel P. Granzow, Bureau of Outdoor Recreation

#### Massachusetts Department of Natural Resources

David Grice, Division of Conservation Services  
Raymond L. Marino, Division of Conservation Service  
Allen E. Peterson, Jr., Division of Marine Fisheries  
Alfred F. Ferullo, Division of Water Pollution Control

#### Metropolitan District Commission

Thomas S. Baron, Construction Division  
Miss Libby Blank  
William R. Thompson, Water Division

#### Metropolitan Area Planning Council

William D. Giezantanner, Open Space Planner

### 3. GUESTS (cont'd)

#### Massachusetts Division of Fisheries & Game

Walter Hoyt, District Wildlife Manager  
Arthur Neill, State Ornithologist  
Joseph Bergin, Fisheries Biologist

#### Massachusetts Department of Public Works

Edward Chase, Division of Waterways

#### Charles River Watershed Association

Mrs. Leon Barron  
Mrs. Joseph B. Fyffe  
Mrs. Helen A. Heyn

#### Local Interests

Allen H. Morgan, Mass. Audubon Society  
Bruce L. Lund, Mass. Audubon Society  
Eric Heller, Sierra Club  
Leonard Potter, Appalician Mountain Club  
Mrs. Stephen D. Paine.

#### New England Division, Corps of Engineers

John Wm Leslie, Chief, Engineering Division  
Joseph L. Ignazio, Chief, Planning Branch  
Lawrence J. Bergen, Chief, Comprehensive River Basin Section  
Arthur F. Doyle, Charles River Study  
John J. Caffrey, Charles River Study  
William McCarthy, Chief, Environmental Resources Section  
Oscar L. Donati, Hydrologic Engineering Branch

#### 4. PROCEEDINGS

The 9th meeting of the Coordinating Committee was convened by Colonel Frank P. Bane, who introduced the Committee members in attendance. The proceedings of this meeting are summarized below. The complete text of formal presentations are attached as appendices

Colonel Bane reviewed the study progress since 24 June 1965. He noted the establishment of the Citizens' Advisory Committee at the beginning of the study, and the assistance that Committee has given the Corps in formulating the final Charles River plan. Water qualities have been inventoried and analyzed by the Federal and State Water Quality Office. The next steps are for local or State agencies to carry out a pollution abatement program. The Soil Conservation Service's potential conservation pools and open space areas, as well as the Massachusetts Division of Natural Resources river corridor concept were briefly discussed. The environmental protection action prospectus, as proposed by the Corps of Engineers, is primarily for the preservation of seventeen major wetlands for containing damaging flood waters. The Corps will recommend that these areas, containing approximately 8,500 acres, be protected through conservation restriction, easements, or purchase by the Federal Government. (See Appendix B for the full text.)

Mr. Doyle described the unique hydraulic characteristics of the Charles River by which the wetlands act as natural flood control reservoirs. A comparison was made between the rapid run-off in the adjacent Blackstone River and the sluggish nature of the Charles, due to its relatively flat profile and extensive wetlands.

Flood damages at present are not a major problem, but if we lose the wetland areas, serious flooding will occur in the middle Charles and serious drainage problems in the upper area. It was indicated that the only effective means of protecting these wetlands are through conservation restriction, easements or acquisition. No construction of dams is planned for these natural valley storage areas. Mr. Doyle discussed the canoe launching sites and the potential bikeway system traversing the lower basin and Muddy River. They will be included in the recreation portion of the report. (See Appendix C.)

Mr. Lund, from the Audubon Society, was asked for his reaction, since one of the areas is owned by the Audubon Society. It

was agreed that an exchange of letters of understanding rather than acquisition of Audubon property would be adequate.

The Sierra Club's comments on the Corps of Engineers' tentative proposals for protection of the natural valley storage areas are attached as Appendix D.

Mr. Gene Mills pointed out that, as of now, the Soil Conservation Service is not prepared to make definite proposals for the twelve potential conservation pools and six potential conservation areas. Proposals will be made based on local interest and after town informational meetings are held.

Mr. William Giezentanner talked about the planning consideration which led to the MAPC's Three Rivers Report on the Charles, Mystic, and Neponset Rivers. Several copies of the map contained in the report were distributed. This map indicated the large open space areas desired along the Charles River, and is the forerunner of the Massachusetts Department of Natural Resources' Outdoor Recreation and Environmental Conservation Plan for the Charles River Watershed.

#### AFTERNOON SESSION

Mr. Gardner, MAPC, indicated they had engaged an engineering firm to study the water supply needs of the 100 council communities to the year 1990. The report of this study is in draft form and has not been approved by the council. Considerations included: a) MDC extension, b) NEWS Study, and c) subgroups.

Mr. Martin Cosgrove, MDC, discussed the three proposals being considered to relieve pollution in the middle and lower Charles River areas. First, in-stream treatment, estimated at \$2 million, is being considered for the Charles Basin. To determine the feasibility, an in-stream treatment pilot program will be installed in the Charles Lagoon. The second proposal being considered is aimed at alleviating pollution in Pugarty Cove. The third, a proposal by Norman-Rothman Associates, is to improve water in the Havey Beach area.

The MDC has jurisdiction on the main stem of the Charles from the mouth to South Natick Dam. If a proposed bill is passed the MDC could extend its jurisdiction to include tributaries flowing to the Charles. The new bill would allow the MDC to look into the problems of Muddy River.

Mr. William Butler, EPA, said their final report would be completed by 15 May. To satisfy water quality needs as expressed by the water quality standards, advanced waste treatment processes beyond the secondary treatment level are necessary. Without any flow augmentation to meet the desired dissolved oxygen level, between 94 and 98 percent of BOD<sub>5</sub> would have to be removed by 1980. Post-aeration and phosphate removal would also be required. It was pointed out that this effluent would be better than existing river water. To achieve the desired level with only secondary level of treatment, theoretical augmentation flows during the critical summer months would be as high as 160 cfs by 1980 and 390 by 2020. EPA analysis showed it would be 30 to 40 percent more costly to extend the MDC system to achieve the same results and would deplete the low flows of the river. Another alternative for water treatment presented was subsurface disposal, whereby secondary treatment effluent would be spread over a sand and gravel bed; thence it would pass into the river through the ground. Communities in the upper Charles should consider forming a regional sewerage district to acquire the proper expertise. (See Appendix E.)

Mr. Butler was followed by Mr. Ferullo of the Massachusetts Division of Water Pollution Control. He stated that waters in the upper river will be improved to the prescribed level by 1974. Pollution in the basin originates from sewer outflows. The B. U. detention tank will alleviate pollution on the north side. Consideration should be given to incorporating two Muddy Brook sewers into the Boston Marginal Conduit. (See Appendix E for Mr. Ferullo's prepared remarks.)

The last two topics concerned a schedule for the remainder of the study and a discussion of the basin plan and its elements. A digest of key points presented by Mr. Joseph L. Ignazio were as follows:

1. This is the last Fiscal Year of funding for the Charles River Study, and by July of 1971 essentially all funds will have been expended. Several areas remain to be pulled together over the next 90 days, the more important of which are:

- a. The holding of a final public meeting.
- b. The preparation of an environmental statement which would await the results of the public meeting.

- c. Final coordination and review of drafts of the main report and appendices with a target date for report reproduction being 1 August 1971.

2. Concerning the final public meeting, it was noted that we are required to provide a 30-day advance notice to the public. In this regard, a 3-page announcement was reviewed with those representatives present. It was concluded that report findings would be presented as an "Environmental Protection Action Prospectus". Following the public meeting, this prospectus would be finalized as the plan. A further clarification concerning the Department of Natural Resources corridor plan for the main stem of the river, as well as the water quality programs of the Metropolitan District Commission that has been accomplished and currently under way would be included in the public announcement. The public announcement would be distributed about 15 April. The Citizens' Advisory Committee was asked to help get the people out for the 13 May meeting to be held at the Dale Street School in Medfield, Massachusetts.

3. Concerning the environmental statement, it was noted that the Charles River plan really is non-structurally oriented with strong programs for conservation. We do not anticipate major difficulties in presenting the environmental statement. The law requires that all interests be given an opportunity to comment upon it and we anticipate a considerable degree of coordination.

4. The next item of discussion concerned the preparation of the final report which is presently approximately 60 percent complete. We are awaiting comments from the State and the Bureau of Outdoor Recreation concerning the DNR Corridor Plan. Authority was granted to use the accomplished studies of the Metropolitan Planning Council concerning water supply requirements and opportunities. It is likely that the future needs of the watershed up through 50 years will have to come from out of basin diversions. The Corps' on-going NEWS Study program would provide information in this regard.

5. Regarding water quality in the basin, we plan to use two existing pieces of work, both of which were reported at the Coordinating Committee meeting; namely, the MDC program to enhance water quality of the lower and middle portions of the Charles; and the plans of the Environmental Protection Agency concerning the water quality needs of upstream communities.



6. Final comments from the Fish and Wildlife agencies, both Federal and State, concerning benefits to the retention of the 17 natural flood storage areas, as well as those proposals of the Soil Conservation Service, are also necessary. The Fish and Wildlife Service has noted that if no water surface is provided, then fishery benefits are those as now available. They were asked to determine to what degree the preservation of these natural areas affects the watershed's fish and wildlife resource by simulation of their loss to urbanization. We will look to the Bureau of Sport Fishery and Wildlife to provide information in this regard. It is recognized that project justification will largely be based upon flood control benefits.

7. The main report will be augmented with eight appendices, three of which are being prepared by other agencies; namely appendices on water quality; soil conservation; and outdoor recreation. The appendix concerning coordination will report upon the extent of meetings throughout the life of the study. Mr. Ignazio suggested to Mr. Ken Wood of the Citizens' Advisory Committee (CAC) that they consider submitting a report of their own to be carried as an attachment, or appendix to the report. Such a document could present the type of meetings and coordination that the CAC has been engaged in. They could discuss the advantages and disadvantages of citizen participation as they view it. Since future studies will more than likely utilize a citizens group such experiences gained in the Charles Study would be well worth noting. Mr. Wood responded favorably to this suggestion.

8. There was discussion as to the role of the Citizens' Advisory Committee upon the completion of the Coordinating Committee's report this summer. It was noted that there will be an interim period of time, maybe two years before actual implementation, assuming the project is approved. It was suggested that the Committee remain active at least through authorization of the report.

9. Concerning the processing of the report, once it is completed by the Committee, it was noted that the report would proceed to the Board of Engineers for Rivers and Harbors, and simultaneously to the Office of the Chief of Engineers. At least 90 days would be required to process the report through the necessary review channels. During this process there could be certain adjustments made to the report, and more likely in the area of cost sharing. A most optimistic schedule of getting actual funds to accomplish acquisitions noted at the 17 natural areas would be Fiscal 73. We envision several months of time during which the report would

remain in an inactive status. The Citizens' Advisory Committee should consider keeping themselves as a group, and viable, perhaps by meeting on frequencies of every six months, to provide a continuation of their important contribution to the goals of the report, and as a reservoir of public support when and if needed. It was also noted to the citizens group that with the establishment of the NERBC, there is a forum established where they can voice their desires and interests.

10. Mr. Ignazio noted that the final report would be submitted in draft copy to the Coordinating Committee and the Citizens' Advisory Committee for a 30-day review. Optimistically, it was hoped that this could take place about mid-June.

11. Considerable attention was given in a discussion of the logic that went into the justification of the 17 natural flood storage areas. The role which the taking of 8,500 acres of land for this purpose and its relationship to the DNR scenic corridor plan, estimated to cost \$25 million was explained. The acquisition of 8,500 acres is expected to cost about \$7.5 million of which 80 percent would be recommended as the Federal share, and 20 percent as local or non-Federal. Land acquisition will afford further opportunities to incorporate recreational facilities of the type to permit extensive recreational pursuits. Included would be canoe launching ramps, and bikeway routes, some of which have been reported in earlier study memos. It was noted that the Corps favors the abandonment of those conservation pools which overlap natural storage areas destined to be preserved, and principally from two viewpoints: (1) they are of shallow depths and in time will become overgrown and difficult to maintain, as well as effect deterioration of water quality; (2) the Committee could be accused of trickery, i. e., buying the land now under the pretense of preservation, and then, returning some years later to develop a water body. If the municipalities are that desirous of these conservation pools, the Corps recommends that those areas where overlap occurs either be abandoned, or taken out of the flood control plan. If the latter be the case, then the State or local elements would be required to pursue their development on their own.

12. There were a series of good questions concerning the role which flood plain management would play in the upper watershed. As relates to the upper 184 square miles of watershed, the 17 natural retention areas will affect control of about 9 percent of land area. Without proper controls for the remaining 91 percent of land area there can still be extensive urbanization which, without the use

of flood plain or other regulatory controls, could generate a series of small local flood problem areas negating the effectiveness of the flood control plan. The final report will discuss in much detail the role which a sound flood plain management program can provide for this basin, and it will seek the support of local communities and the State in working toward this end. The preservation of the 17 natural storage areas are viewed as one part, albeit an important one, of a total flood control plan. To make the zoning effective, care must be exercised in effecting wise land use. In this regard, there should be a means by which owners can be equitably reimbursed for losses sustained.

13. In summary, it was concluded that the plan provides an attractive non-structural proposal which is unique, and the first of its type nation-wide, to prevent or keep under control flood damages caused through indiscriminate urbanization. There are, however, many items yet to be resolved, the more outstanding of which are equitable reimbursement, tax losses, and permitted land uses. It was made clear that although the Corps would acquire lands for the 17 areas, they would not operate and maintain these areas. A maintenance of Federal title and control but without actual operation and maintenance programs, which would likely be given to a State body.

Colonel Bane concluded the meeting by stressing the need for public support at the coming public meeting, at project justification meetings, and the need for letters to Congressional members.

CHARLES RIVER STUDY

AGENDA

NINTH COORDINATING COMMITTEE MEETING

Thursday, 8 April 1971

New England Division, Corps of Engineers  
424 Trapelo Road, Waltham, Massachusetts

9:30 A. M.      REGISTRATION

10:00 A. M.

- I      STUDY RECAPITULATION AND SUMMARY  
         Report Findings
- II     NATURAL VALLEY STORAGE
  - 1. Hydraulic and Flood Control Need
  - 2. Real Estate Appraisal and Field Work
  - 3. Reaction of Local Interests
- III    CONSERVATION POOLS AND AREAS  
         Investigation, Screening and Current Status
- IV     OUTDOOR RECREATION AND ENVIRONMENTAL  
         CONSERVATION
  - 1. Corridor Plan
  - 2. Canoeways and Bikeways
- V      WATER QUALITY AND WATER SUPPLY
  - 1. Watershed
  - 2. Basin
- VI     SCHEDULE FOR REMAINDER OF STUDY  
         Including participation in the 13 May 1971 Public  
         Meeting
- VII    DISCUSSION AND RESOLUTION OF BASIC PLAN  
         ELEMENTS

APPENDIX B

Recapitulation and Summary

by

Colonel Frank P. Bane

8 April 1971  
Coordinating Committee Meeting

## APPENDIX B

### CHARLES RIVER STUDY

#### NINTH COORDINATING COMMITTEE MEETING

8 APRIL 1971

#### PRESIDING OFFICER

#### RECAPITULATION AND SUMMARY

A resolution by the committee on public works of the House of Representatives, adopted 24 June 1965, authorized the Charles River Study. The basic objective of the study was to formulate a plan of development which would serve as a guide for the best use, or combination of uses, of water and related land resources to meet short and long term needs of the watershed.

Early in the study a Coordinating Committee was established, also a Citizen Advisory Committee. The Citizen Advisory Committee was convened to provide better and more local means of communication between watershed interest groups and the study agencies than would be available through the study Chairman alone.

The study was divided into two parts, the first reporting on the lower Charles and a second report covering the entire watershed. The lower Charles Report recommended construction of a new dam at Warren Avenue, three navigational locks, and a pumping station. This project has been authorized and is being designed.

The present study covers the entire watershed. Studies of the Middle and Upper River, above Moody Street, Waltham, have been completed. Included in the studies were pollution abatement, water storage, open space corridor and an environmental protection action plan.

Charles River water qualities have been inventoried, analyzed and documented from samples taken by the Federal Water Quality Office and the Water Pollution Control Division of the Massachusetts Department of Natural Resources. Many, and perhaps most of the known major sources of Charles River Pollution have been identified.

Charles River Water Quality classifications recently have been duly established in conformance with State and Federal standards. The next steps are for the Municipal, District and State agencies to develop and carry out a specific plan of Charles River pollution abatement to meet the approved river classifications.

Potential water storage sites on streams tributary to the Charles have been listed by the Soil Conservation Service, U.S. Department of Agriculture, Amherst, Massachusetts some 47 potential sites were mapped and listed and subsequently reduced to 12 sites together with six conservation areas.

Potential water storage sites along the mainstem of the Charles River were investigated by the New England Division. These potential sites, after being studied, were dropped from consideration.

A plan for outdoor recreation and environmental conservation in the Charles River watershed was presented in the Massachusetts Department of Natural Resources report. This 1970 report was the pilot test of methods and procedures for all of the State studies. The protection and/or acquisition of 10,000 acres for an open space corridor is proposed.

The Environmental Protection Action prospectus as proposed by the Corps of Engineers is primarily for the preservation of the major wetlands for containing flood damaging waters. Seventeen areas, totaling about 8,500 acres have been designated to be retained in their existing condition. If these wetland areas were to be appreciably filled-in, serious flooding would occur in downstream communities and many internal drainage problems would occur in the upstream communities.

Personnel from my office have been working in close liaison with planners of other agencies. The State Outdoor Recreation Corridor Plan is dovetailed with the natural valley storage areas. Duplication of areas of consideration between the SCS and Corps of Engineers is being resolved and coordination will continue until there is no conflict.

We will be recommending that the 17 areas, approximately 8,500 acres, be protected through conservation restriction, easements or purchase by the Federal government for the prevention of future flood damages, but since other resource demands will also be satisfied, local interests will be asked to participate in cost sharing.

APPENDIX C  
NATURAL VALLEY STORAGE

by

Arthur F. Doyle  
Corps of Engineers

8 April 1971

Coordinating Committee Meeting



## CHARLES RIVER STUDY

Coordinating Committee Meeting  
8 April 1971

### NATURAL VALLEY STORAGE

by

Arthur F. Doyle  
Corps of Engineers

#### 1. Unique Hydraulic Characteristics and Flood Control Needs

The principal flood problem in the Charles River watershed occurs along the Basin in Boston and Cambridge. The authorized Warren Avenue pumping structure will eliminate the flood hazard in this area.

Throughout the remainder of the watershed, flooding at the present time is not major. The relatively low flood flows experienced in the Middle and Upper Charles may be attributed principally to the extensive marshes and swamps along the Charles and its principal tributaries upstream of the Silk Mill Dam in Newton.

Hydrologic studies have demonstrated the value of these wetlands. In the flood of August 1955, about 50,000 acre-feet of flow occurred after the peak discharge, most of this same from water stored in the wetlands and lakes. This is equivalent to about five inches of runoff from a drainage area of 184 square miles at the Charles River Village gage and these wetlands have the same storage capacity as either the North Springfield or Birch Hill flood Control Reservoirs. Maximum flood flows are exceedingly low in the Charles when compared with the adjacent Blackstone

River. At a comparable point in the Blackstone nearly 60 percent of the 1955 flood volume passed in two days. The entire flood had substantially passed in a week. At Charles River Village only 10 percent passed in two days. It took a week to pass 50 percent of the flood and about a month for the total runoff to pass.

During this 1955 flood, the peak flows reached 3,220 cfs at the gage. Flows in the Blackstone reached 16,900 cfs for a somewhat smaller drainage area of 139 square miles. That the peak flood flows from the Upper Charles are extremely low is attributable to the natural valley storage afforded by the wetlands.

Seventeen wetland areas, totalling about 8,500 acres have been designated as having major importance. Without restrictions, these wetlands will be subject to urban expansion with a resulting loss of storage and therefore, increased runoff. Furthermore, maintaining these areas in an undeveloped state will increase its value for fish and wildlife and for recreation as the population and development in the region increases.

Flood damages in the Upper reaches amounted to only about \$400,000 during the March 1968 flood. We have determined that if 40 percent of the wetlands are lost, the flood stages in middle and upper river will increase by 2, 3 or 4 feet at various locations for a recurring 68 flood and causing an anticipated \$12 million dollars worth of damage. Historically, we have been losing our wetlands at the rate of one percent at year. Within the coming years, this rate is expected to increase,

especially in the area between Route 128 and Route 495. We, therefore, recommend preserving the seventeen major areas through easement, lease back or outright purchase.

## 2. Real Estate Appraisal and Field Work

Effective means of protecting these wetlands are through conservation restriction, easements or acquisition. Land acquisition is based on the premise that no existing buildings or other improvements presently situated in these areas will be acquired, nor will access be restricted to these improvements. It is further assumed that a permit or easement will be granted to allow existing facilities to remain in place. The facilities include public utilities, such as pipe lines, electric or telephone lines, municipal water and sewer facilities, roads, railroad lines and other like improvements.

Where substantial amounts of high land are encompassed by an area it is assumed that access will be granted over the wetland areas to prevent these higher areas from becoming landlocked or otherwise inaccessible.

Our recommendations are predicated on the assumption that there is no construction, such as dams, planned for these areas which will cause unnatural flood conditions, and consequently, there will be no flood damages to existing improvements resulting from other than natural conditions. In the case of improved lots or potentially developable lots it is proposed to acquire only restrictive easements over the very low

portions of the lots, thereby allowing for the continued future use or development of the higher front portions of the lots.

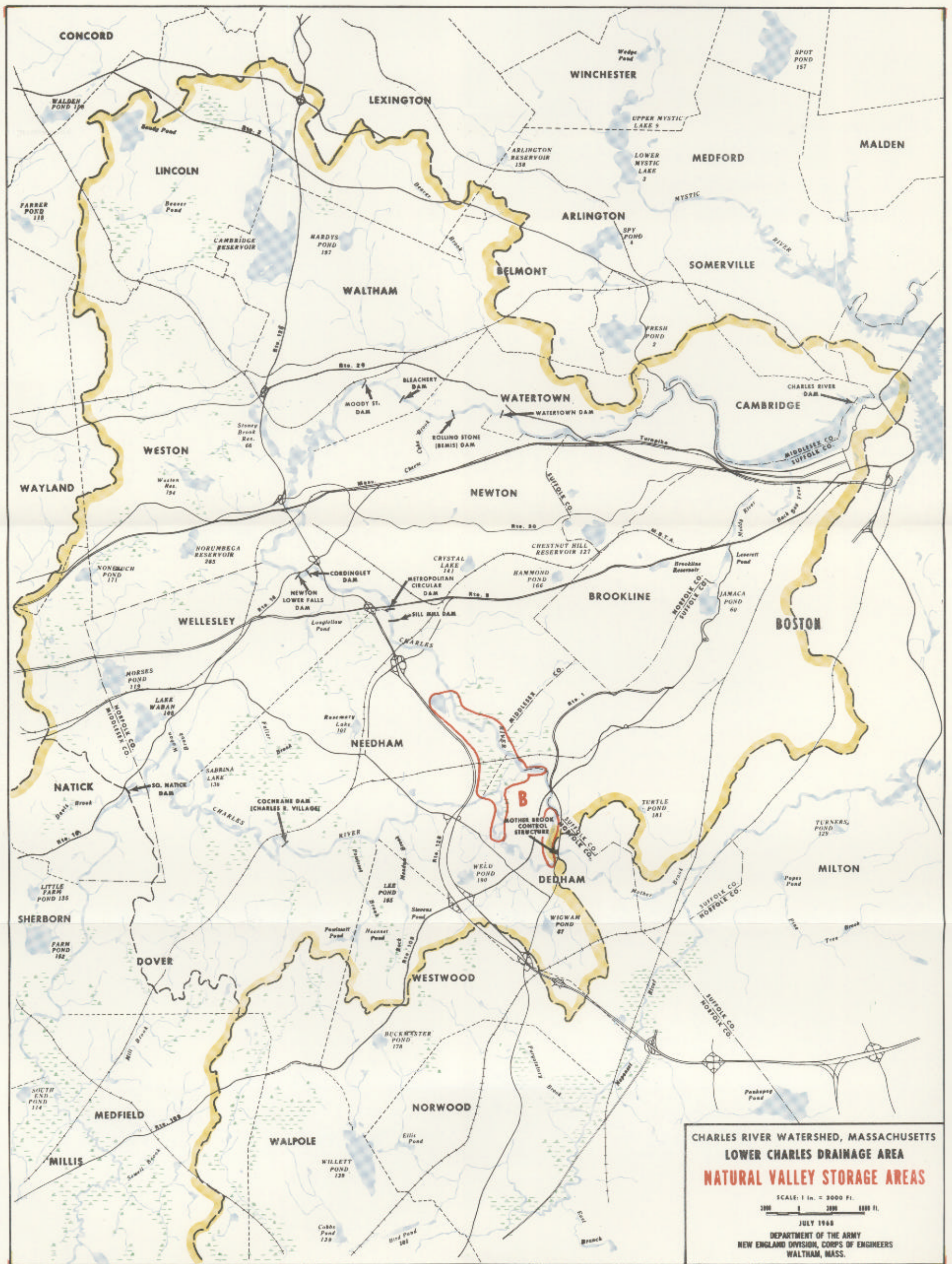
Lands once acquired or protected would remain in their natural state, that is, no new construction will be allowed on them now, or in the future.

April 1971

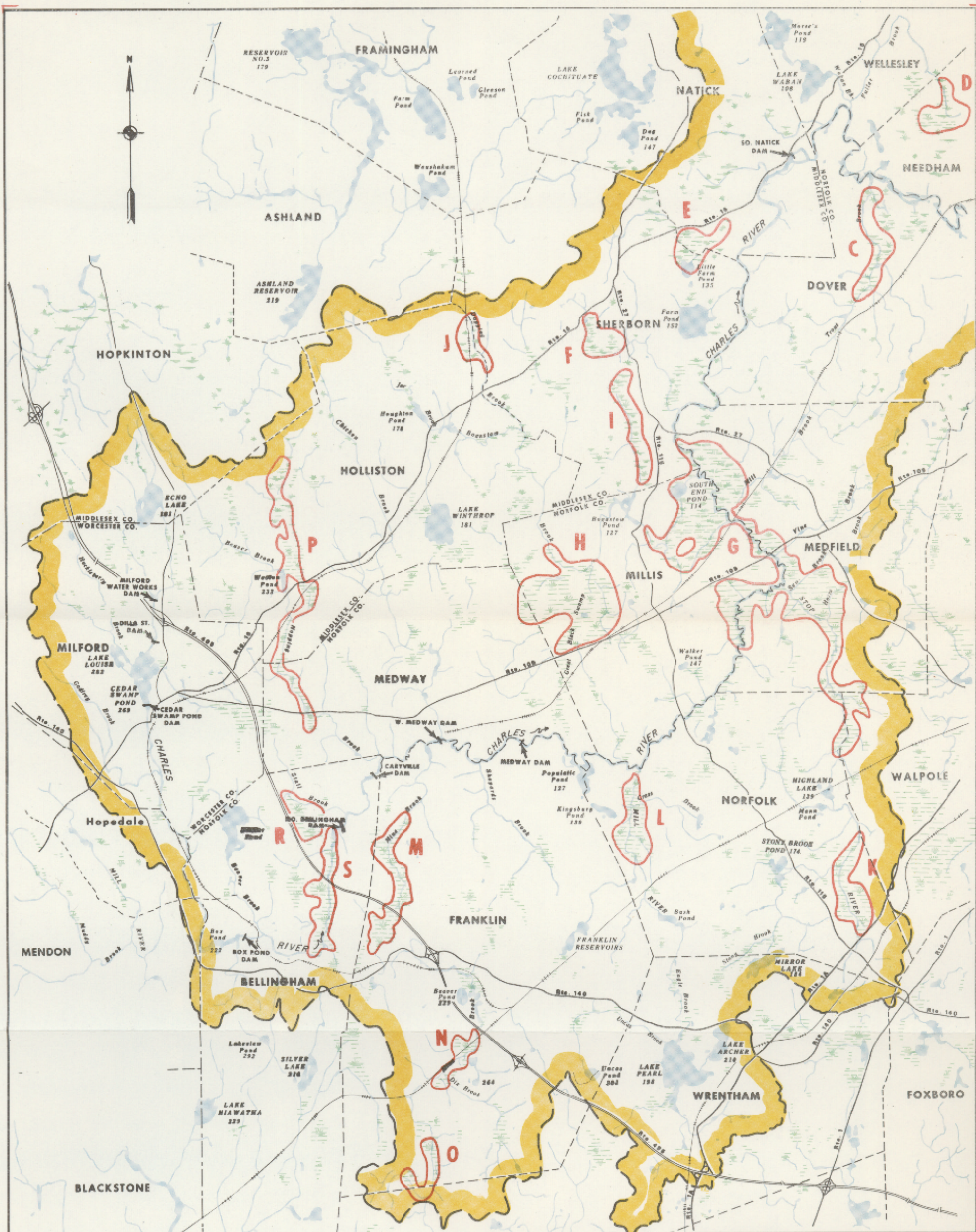
CORPS OF ENGINEERS  
NATURAL VALLEY STORAGE AREAS  
Ownership (Acres)

Area	State	Municipal	Private Conservation Soc.	Private	Total
B	648	39	-	342	1,029
C	-	22	-	228	250
D	-	43	-	241	284
E	-	-	200	34	234
F	-	6	-	112	118
G	77	358	229	1,676	2,340
H	-	16	-	891	907
I	-	-	-	280	280
J	-	3	-	127	130
K	390	-	-	5	395
L	-	-	-	360	360
M	-	2	-	393	395
N	-	5	-	145	150
O	105	-	-	161	266
P	-	80	-	624	704
R	-	15	-	165	180
S	-	-	-	400	400
Totals	1,220	589	429	6,184	8,422









CHARLES RIVER WATERSHED, MASSACHUSETTS  
UPPER CHARLES DRAINAGE AREA  
NATURAL VALLEY STORAGE AREAS

SCALE: 1 in. = 3000 ft.  
0 3000 6000 ft.

JULY 1968  
DEPARTMENT OF THE ARMY  
NEW ENGLAND DIVISION, CORPS OF ENGINEERS  
WALTHAM, MASS.



MAR 31 REC'D

Sierra Club  
New England Chapter  
373 Huron Avenue  
Cambridge, Massachusetts 02138

Mr. Arthur Doyle  
Army Corps of Engineers  
424 Trapelo Road  
Waltham, Massachusetts

Dear Sir:

The Sierra Club is a national organization of 120,000 members which was formed to promote the intelligent employment and conservation of the natural resources of the United States. The New England Chapter, headquartered in Cambridge, Massachusetts, has 4,000 members and is particularly concerned with environmental questions affecting the New England region.

The tentative proposals of the Army Corps of Engineers, New England Division, resulting from the 5 year study of the Charles River watershed have been carefully studied. Particular attention has been paid to the unique proposal to acquire 19 wetland areas, to be maintained in perpetuity in their natural state, as the most effective and economical means of achieving flood control protection for the Charles River watershed. These areas have been designated "Natural Valley Storage Areas A through S" on the Corps maps.

The New England Chapter of the Sierra Club wishes to express its support for the Corps proposal to acquire the 19 wetland areas for preservation in their natural state. This program will serve the needs of the watershed for conservation of fast disappearing natural areas as well as flood control protection.

Sincerely,

*Paul Swatek*

Paul Swatek, Chairman

cc: Col. Frank P. Bane  
Army Corps Of Engineers  
424 Trapelo Road  
Waltham, Massachusetts



APPENDIX E  
CHARLES RIVER WATER QUALITY

by

William J. Butler  
U. S. Environmental Protection Agency  
Federal Water Quality Administration

8 April 1971

Coordinating Committee Meeting

## CHARLES RIVER WATER QUALITY

U. S. Environmental Protection Agency  
Federal Water Quality Administration

William J. Butler

8 April 1971

1. To satisfy water quality needs as expressed by the water quality standards, advanced waste treatment processes beyond the secondary treatment level are necessary. As population increases, demands for even higher water use can also be anticipated. Further engineering studies will be needed to determine the final design of these facilities, and the extent to which low flow augmentation, industrial plant process changes, and other control measures are to be used.
2. For purposes of comparison in evaluating the need for flow augmentation, a minimum treatment level consisting of secondary treatment and six months operation of a coagulation and sedimentation process to remove phosphate was assumed. In addition to nutrient removal, approximately 90 percent of the BOD<sub>5</sub> is removed by this type of treatment.
3. To maintain an average dissolved oxygen level of 5.5 mg/l in the Charles River and tributaries only with the minimum level of treatment, theoretical augmentation flows during the critical summer months would be as high as 165 cfs by 1995, and 390 cfs by 2020. This augmentation would be in addition to the minimum base flow plus the flow corresponding to waste discharges. All augmentation water was assumed to contain dissolved oxygen levels equivalent to 88 percent saturation.
4. Without any flow augmentation, to meet an average dissolved oxygen level of 5.5 mg/l during low flow periods, by 1980, 94 and 98 percent of the BOD<sub>5</sub> would have to be removed and effluents aerated to 6 mg/l. To achieve these efficiency levels with existing technology, the municipalities, except Sherborn, would typically have to provide the equivalent of primary treatment, secondary treatment, coagulation, sedimentation, filtration, carbon adsorption and post-aeration.
5. Assuming no flow augmentation, analyses have been made which compare the average annual costs of individual treatment plants and alternate regional treatment plants required to provide adequate dissolved oxygen levels in the stream. Generally, results indicate for the 1970 to 1995 period, individual plants are more economical than regional alternatives with the possible exception of a dual plant serving Millis

and Medfield at an estimated average annual saving of 5 percent. During the 1995 to 2020 time frame, a regional plant serving Norfolk, Millis, Medfield and Holliston would save approximately 13 percent. In many cases, however, the costs of alternatives were within 10 percent of each other and considered economically equivalent. Average annual costs are in the order of \$1,600,000 for the 1970 to 1995 time frame, and \$3,000,000 during the 1995 to 2020 period. The costs are at an interest rate of 4-5/8 percent. They include costs of operation and maintenance. Operation of advanced treatment processes was assumed necessary for only six months per year.

6. The technology of advanced waste treatment is improving rapidly. While the costs and processes used herein are considered valid for comparing alternate water quality control measures for general planning purposes, the actual cost of future construction may be reduced as new or improved processes and operating procedures are developed.

7. In those circumstances where the costs of alternate treatment plant configurations are about the same, other considerations will play a deciding role in choosing the alternative, particularly where decisions will be needed in the immediate future. Some of the major considerations are as follows:

- a. Regional treatment plants would remove waste discharges from tributary streams and the upper reaches of the Charles River, but also could deplete flows to such an extent that desired uses may be curtailed in the affected reaches.

- b. Regional treatment plants require less land and physical plant than a series of individual treatment plants. Aesthetic benefits associated with the fewer treatment plants may be a factor.

- c. Larger treatment plants generally are better able to absorb changing characteristics and volume of wastes being treated.

- d. Timing of construction between communities could make it difficult to implement a regional facility.

8. Curves have been prepared which indicate the savings in the cost of advanced waste treatment, i. e., treatment beyond the assumed minimum treatment level, as a result of providing intermediate levels of flow augmentation for various zones on the Charles River and tributary streams. It may be possible to achieve a net savings in treatment plant costs by providing flow augmentation. Preliminary investigations made by the Corps of Engineers and the Soil Conservation Service indicate that flow augmentation sites on Mine Brook, Stop River, Bogastow Brook, and the upper reaches of the Charles River may provide a net

savings in the treatment costs of sources in Franklin on Mine Brook, in Norfolk on the Stop River, in Holliston on Bogastow Brook, and in Milford on the Charles River. In addition to reducing treatment costs, low flow augmentation can be used to reduce the effect of non-point sources of pollution on the river.

9. Cost analyses have been made of collecting wastes from the watershed, transporting them to the MDC treatment plant at Nut Island, and expanding the Nut Island facility. Average annual costs of this method of disposal, which includes operation and maintenance costs, are \$2,120,000 for the 1970 to 1995 time period, and \$4,620,000 during the 1995 to 2020 period. Disposal of all wastes outside of the watershed is more expensive than treatment and disposal within the watershed, and could seriously deplete flows in the Charles River, therefore it is considered impractical. However, on an individual basis, it may be economical for a community, particularly one that may border a member of the MDC sewerage system, to join the MDC.

10. Subsurface disposal of Chlorinated secondary waste effluent may offer an economical means of meeting water quality goals and should be considered by the upper Charles River communities. Preliminary studies of the U. S. Geological Survey indicate that sand and gravel lenses suitable for waste water spreading may exist. However, prior to its use, detailed borings and percolation studies would be required.

11. Post-Aeration is considered necessary to assure that adequate dissolved oxygen levels are maintained in the stream below outfalls. Full advantage should also be taken of the aeration afforded by devices such as cascades or weirs, either in-stream or in the waste effluent channel to reduce the cost of mechanical post-aeration.

12. The communities in the Upper Charles River watershed should consider forming a regional sewerage district. Treatment plants that will be needed in the future, whether they serve an individual community or a regional area, will be complex and require highly trained personnel. The ability to employ highly qualified personnel is enhanced under a single authority. Also operational and maintenance problems may be corrected more quickly because of the greater variety of specialists and availability of central maintenance facilities and a large spare parts inventory.

13. To reduce the adverse effects of urban run-off, watershed communities, if necessary, should institute and enforce comprehensive sewer use ordinances, establish effective sewer inspection and maintenance programs, and implement urban beautification programs.

14. To reduce or prevent pollution from sanitary landfills, communities should adhere to existing State regulations for the proper disposal of solid wastes. In those communities where pollution from solid waste disposal now occurs, corrective measures should be taken in accord with implementation schedules established by the Commonwealth of Massachusetts.

15. It is important that the water related land use plan that is developed as part of the Charles River Watershed Comprehensive Study be closely coordinated with the achievement of water quality standards to insure that the desired uses of the waters can be fully realized.

16. Water quality standards are not static. They should be continuously evaluated and upgraded to reflect changes in public and private interests, technology, and financial resources.

APPENDIX F  
FUTURE WATER QUALITY

by

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Division of Water Pollution Control  
Massachusetts Department of Natural Resources

8 April 1971

Coordinating Committee Meeting

FUTURE WATER QUALITY IN THE CHARLES RIVER

Massachusetts Division of Water Pollution Control

In order for the Charles River to meet the standards of the assigned classifications above Watertown Dam, wastewater treatment plants must be designed to operate at efficiencies up to 95 percent. Since water quality is influenced significantly by excessive algae populations during the summer months, phosphorus, a key nutrient in the growth of these organisms will have to be removed in the treatment process.

Regional wastewater treatment plants will be encouraged in order to reduce both construction and operating costs. It is estimated that the waters in the upper river will be improved to the prescribed levels by 1974.

Between Watertown Dam and the Charles River Dam, the section known as the Charles River Basin, pollution originates primarily from the combined sewer overflows. Stratification due to salt water intrusion through the old dam has aggravated conditions creating an environment in which even the bottom muds in certain areas are devoid of organisms.

The MDC Boston University Chlorination and Detention Facility just completed, is expected to improve both the aesthetic and bacterial quality of the water both upstream and downstream of the B.U. Bridge. Separation of the combined sewers in Cambridge should reduce combined sewer overflows from the north bank of the Charles River Basin within the next five years. The section on the south bank of the Charles River from Muddy River to the new dam at Warren Avenue will require construction by the City of Boston and the M.D.C. to ensure that combined sewer overflows will be reduced to a frequency approximating that above the B.U. Facility. The new dam will reduce salt water intrusion and minimize stratification.

It is hoped that the Charles River Basin will meet "C" classification criteria by the time the Warren Avenue Bridge is completed.

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